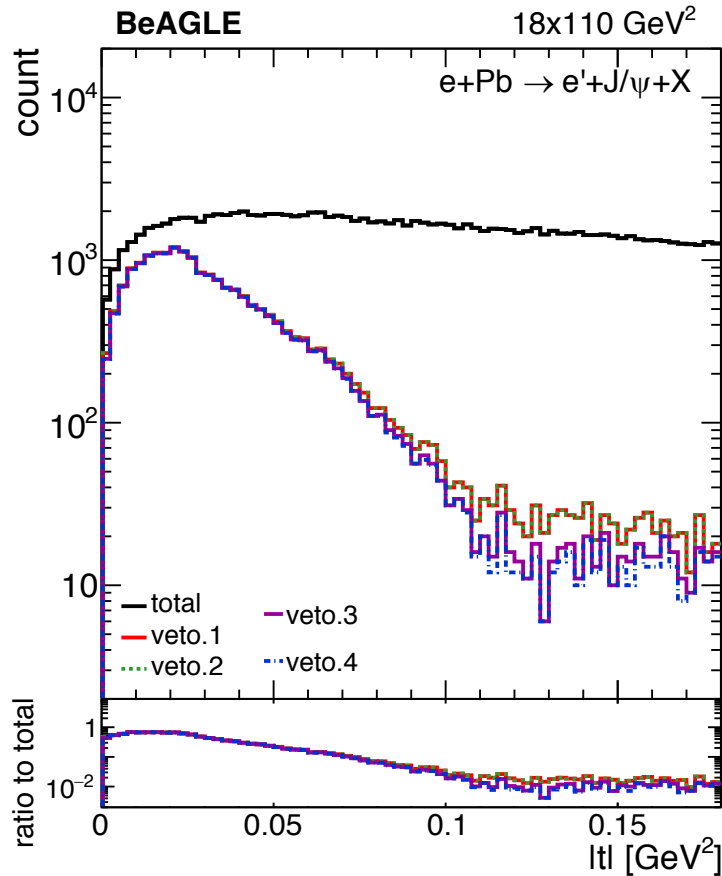


Vetoing incoherent events

Wan Chang

2021.03.04

Without beam pipe



Without beam pipe, there are 2.5% events survived after the cuts.

Veto.1:

➤ no neutron in ZDC

Veto.2:

➤ Veto1 + no proton in Roman Pots

Veto.3:

➤ Veto2 + no proton in off-momentum detector

Veto.4:

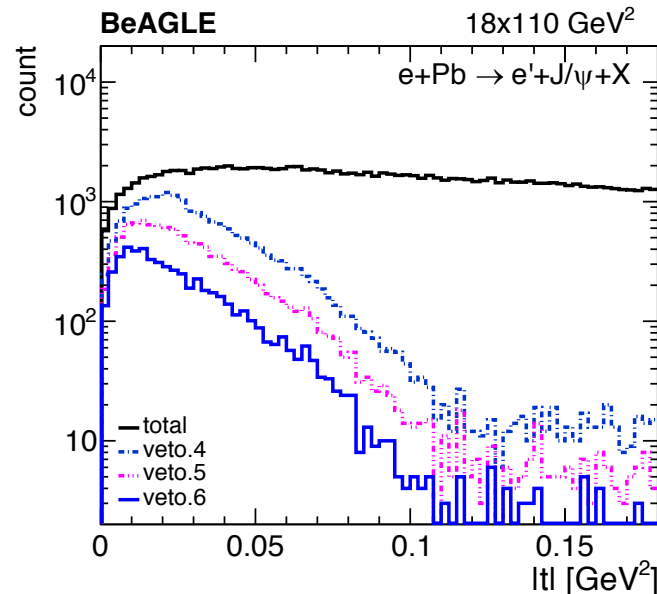
➤ Veto3 + no proton in B0

Veto.5:

➤ Veto4 + no anything in preshower

Veto.6:

➤ Veto5 + no photon $E > 50 \text{ MeV}$ in ZDC



Survived event count

Total events	250000
Cut1	26752
Cut2	26752
Cut3	25765
Cut4	24809
Cut5	13073
Cut6	6297

With update beam pipe

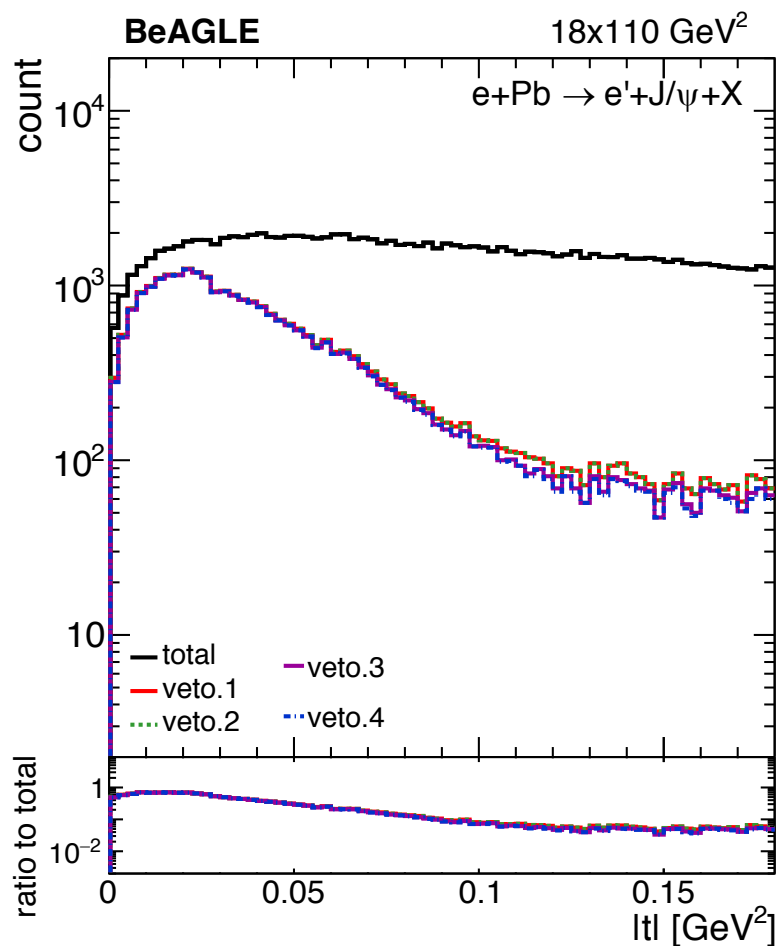
Beam pipe material:

beamPipeQuads: **aluminum**

beamPipeB0: **aluminum**

beamPipeRP: **aluminum**

beamPipeZDC: **aluminum**



Veto.1:

- no neutron in ZDC

Veto.2:

- Veto1 + no proton in Roman Pots

Veto.3:

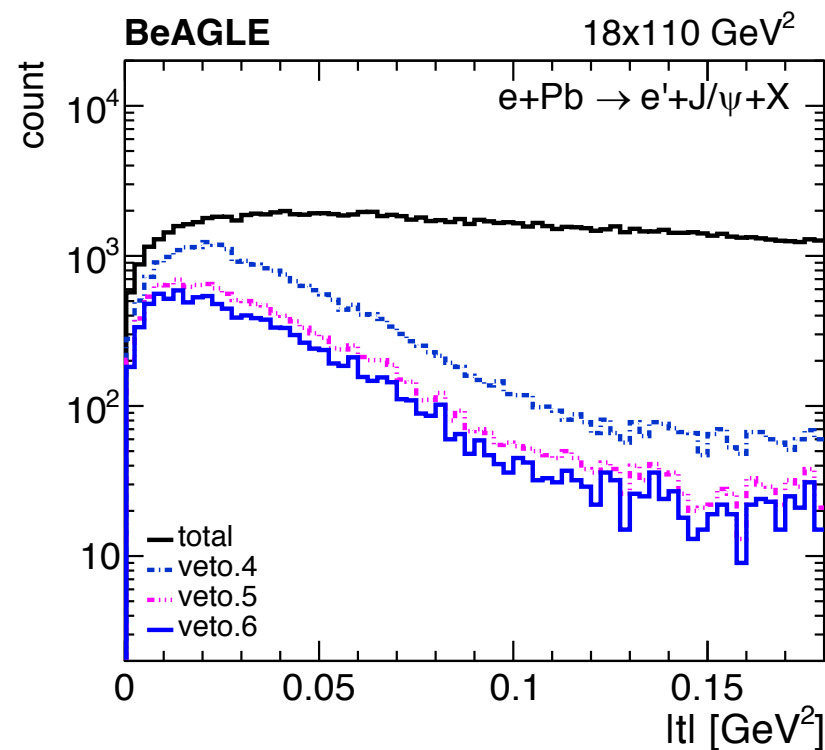
- Veto2 + no proton in off-momentum detector

Veto.4:

- Veto3 + no proton in B0

Survived event count	
Total events	250000
Cut1	41819
Cut2	41819
Cut3	40554
Cut4	39234

With update beam pipe



Veto.5:

➤ Veto4 + no anything in preshower

Veto.6:

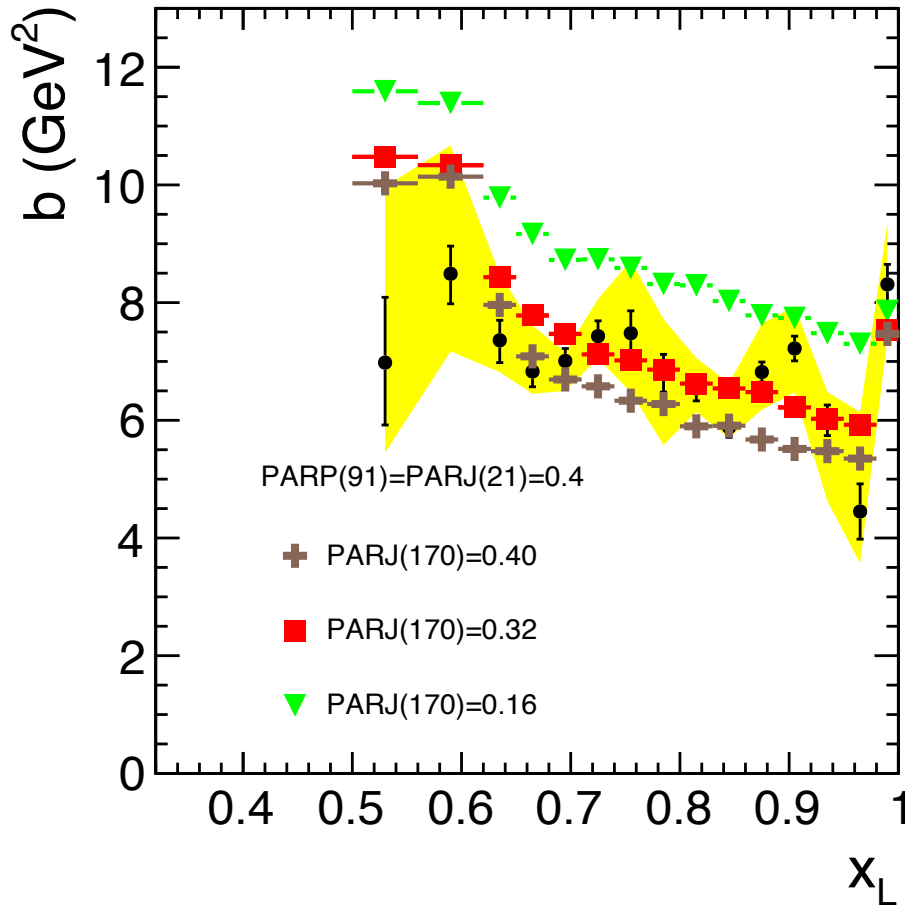
➤ Veto5 + no photon $E > 50 \text{ MeV}$ in ZDC

Survived event count	
Total events	250000
Cut1	41819
Cut2	41819
Cut3	40554
Cut4	39234
Cut5	18270
Cut6	14517

There are 5.8% events survived after the cuts.

Pythia

With input.data.ep_noradcor.20x250.eic.FF.HERMES.VMD.Mark.NewRCPT

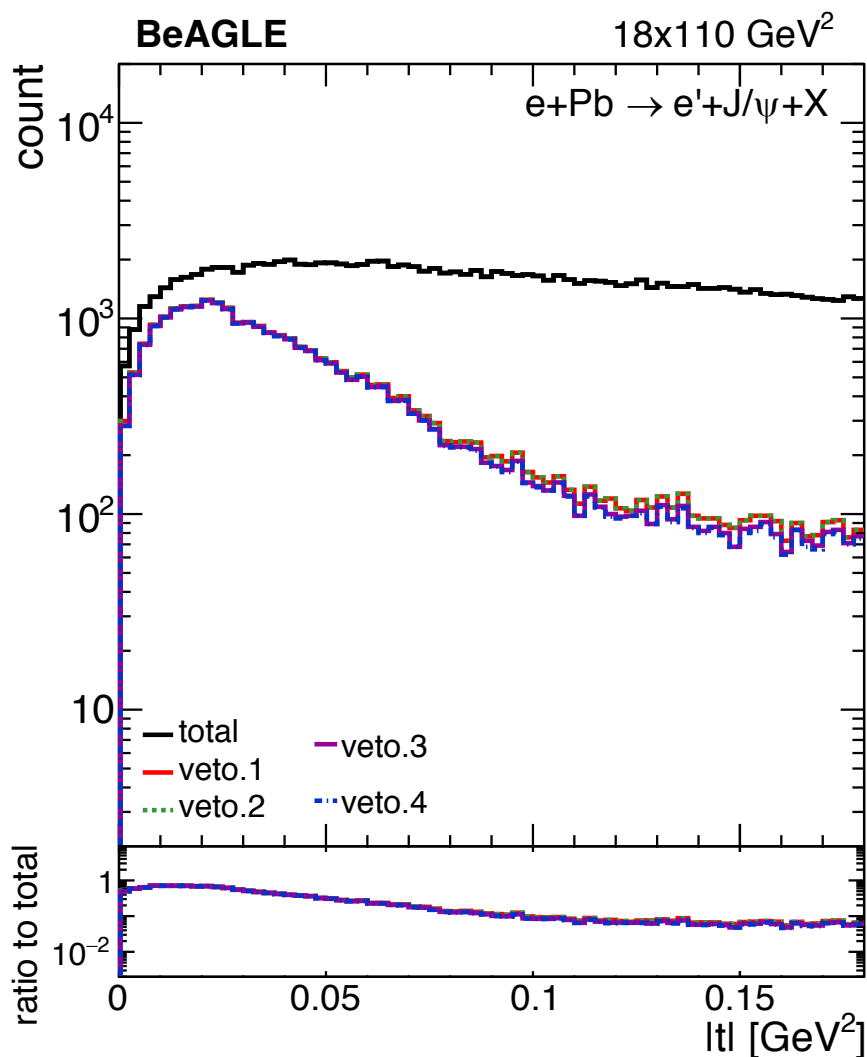


The histogram with $\text{PARJ}(170)=0.32$ matches the data better.

Backup

With beam pipe

The beam pipe is broken into sections to make it a bit easier to turn pieces on and off in the simulation.



Beam pipe material:

beamPipeQuads: **aluminum**

beamPipeB0: **aluminum**

beamPipeRP: **beryllium**

beamPipeZDC: **beryllium**

Veto.1:

➤ no neutron in ZDC

Veto.2:

➤ Veto1 + no proton in Roman Pots

Veto.3:

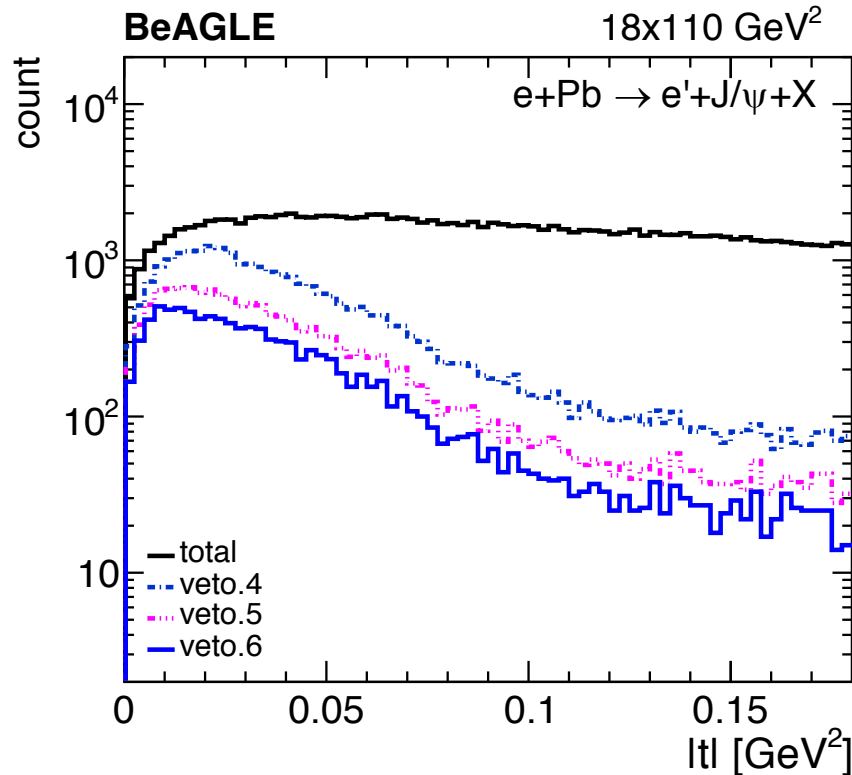
➤ Veto2 + no proton in off-momentum detector

Veto.4:

➤ Veto3 + no proton in B0

Survived event count	
Total events	250000
Cut1	44418
Cut2	44418
Cut3	43160
Cut4	41821

With beam pipe



Veto.5:

➤ Veto4 + no anything in preshower

Veto.6:

➤ Veto5 + no photon $E > 50 \text{ MeV}$ in ZDC

Survived event count	
Total events	250000
Cut1	44418
Cut2	44418
Cut3	43160
Cut4	41821
Cut5	19530
Cut6	13414

With beam pipe, there are 5.37% events survived after vetoing neutrons, protons and photon.